CHAPTER 60
VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) PERMIT REGULATIONS

Part II Stormwater Management Program Technical Criteria

4VAC 50-60-66 Water Quantity

Properties, state waters, and stormwater conveyances within or downstream of a land disturbing activity shall be protected from sediment deposition, erosion and flood damage due to increased runoff in accordance with the minimum standards set out in this section.

A. If any one of the following conditions is met, then no additional stormwater quantity controls are required:
   1. Prior to any land disturbance, the contributing drainage area from the *site* to a *point of discharge* is less than or equal to one (1) percent of the total watershed area draining to that point of discharge.
   2. Prior to the application of any stormwater quantity controls, the *development* results in an increase in the peak discharge of stormwater runoff that is less than one (1) percent of the existing peak discharge of stormwater runoff generated by the total watershed area draining to that point of discharge.
   3. Prior to the any land disturbance or the application of any stormwater quantity controls, the *point of discharge* is to a *man-made stormwater conveyance system* that is not currently eroding[1] and will convey the post-development 2-year 24-hour storm runoff without causing erosion of the system, and contains the post-development 10-year 24-hour storm runoff within the defined system. The applicant must demonstrate, using accepted hydrologic and hydraulic design methodologies, that the runoff from the site, in combination with other existing and proposed *stormwater discharges* does not exceed these criteria.
   4. Prior to the any land disturbance or the application of any stormwater quantity controls, the *point of discharge* is to a *restored stormwater conveyance system* that is not currently eroding[2] and will convey the post-development 1-year 24-hour storm runoff without causing erosion of the system; and contains the post-development 10-year 24-hour storm within the defined system. The applicant must demonstrate, using accepted hydrologic and hydraulic design methodologies, that the runoff from the site, in combination with other existing and proposed *stormwater discharges* does not exceed these criteria.
   5. The point of discharge is to a *natural stormwater conveyance system* that is not currently eroding[3], contains the post-development 10-year 24-hour storm runoff within the defined system, and the site pre-development runoff characteristics and site hydrology have been replicated[4] for the 1-year 24 hour storm in accordance with:

[1] Specific guidance needed – what constitutes eroded or eroding channel, and how far downstream does the assessment go?
[2] Specific guidance needed (as above).
[3] Specific guidance needed (as above).
[4] Options for "Replication"

$Q_{Developed} = Q_{Pre\text{-}Developed} * (RV_{Pre\text{-}Developed} / RV_{Developed})$, where

$Q_{Developed}$ = The allowable peak flow rate of runoff from the developed site

$Q_{Pre\text{-}Developed}$ = The peak flow rate of runoff from the site in the pre-developed condition

$RV_{Pre\text{-}Developed}$ = The volume of runoff from the site in the pre-developed condition.

$RV_{Developed}$ = The volume of runoff from the site in the developed site

B. If none of the conditions set out in subdivision (A) of this section are met, then one of the following criteria shall be required. All required improvements to *stormwater conveyance systems* must accommodate the runoff from the site, in combination with other existing and proposed discharges.
   1. Land disturbing activities discharging to man-made stormwater conveyance systems that do not meet all of the conditions in A.3 must:
      a) Provide *stormwater conveyance system* improvements such that the system will convey the post-development 2-year 24-hour storm runoff without causing erosion of the system and contain the post-development 10-year 24-hour storm runoff within the defined system; or
      b) Provide restoration of the *stormwater conveyance system* using *natural channel design concepts*[1]; or
      c) Provide on-site quantity controls such that the *stormwater conveyance system* will convey the post-development 2-year 24-hour storm runoff without causing erosion of the system and will contain the post-development 10-year 24-hour storm runoff within the defined system; or
      d) Provide a combination of on-site quantity controls and stormwater *conveyance system improvements* satisfactory to the plan approving authority.
   2. Land disturbing activities discharging to *restored stormwater conveyance systems* that do not meet all of the conditions in A.4 must:
      a) Provide *stormwater conveyance system* improvements such that the system will convey the post-development 2-year 24-hour storm runoff without causing erosion of the system, and contain the post-development 10-year 24-hour storm runoff within the defined system; or
      b) Provide restoration of the stormwater conveyance system using *natural channel design concepts*;
      c) Provide on-site quantity controls such that the *stormwater conveyance system* will convey the post-development 1-year 24-hour storm runoff without causing erosion[2] of the system and will contain the post-development 10-year 24-hour storm runoff within the defined system; or
      d) Provide a combination of on-site quantity controls and conveyance system improvements satisfactory to the plan approving authority.

[1] Defintion in ESC Law
[2] Guidance/Explanation – When couldn't this be achieved thus requiring Energy Balance

3. Land disturbing activities discharging to natural *stormwater conveyance system* that do not meet all of the conditions in A.5 must:
   a) Provide *stormwater conveyance system* improvements such that the system will convey the post-development 2-year 24-hour storm runoff without causing erosion of the system and contain the post-development 10-year 24-hour storm within the defined system; or
   b) Provide restoration of the stormwater conveyance system using *natural channel design concepts*[1].
4. Compliance with section B above can be achieved by providing the following:
   a) Stormwater quantity controls for the 1-year 24 hour storm runoff in accordance with:

$$Q_{Developed} = Q_{Forested} * (RV_{Forested} / RV_{Developed}), \text{ where}$$

$Q_{Developed}$ = The allowable peak flow rate from the developed site

$Q_{Forested}$ = The peak flow rate from the site in a pre-developed condition

$RV_{Forested}$ = The volume of runoff from the site in a pre-developed condition.

$RV_{Developed}$ = The volume of runoff from the developed site

   b) Stormwater quantity controls such that the *stormwater conveyance system* will contain the post-development 10-year 24-hour storm runoff within the defined system.

C. Increased volumes of sheet flow resulting from disconnected pervious or impervious areas, or from physical spreading of concentrated flow through level spreaders, must be identified and evaluated for potential impacts on down gradient properties or resources[2].

D. Local programs may develop and implement a watershed plan[3] that identifies alternate criteria for design storms, stormwater conveyance system definitions, or acceptable on-site or regional stormwater controls for specific *watersheds*, *natural watercourses*, or *stormwater conveyance systems*. Such a watershed plan must be reviewed and approved by DCR.

E. For purposes of computing predevelopment runoff from prior developed sites, all pervious lands on the site shall be assumed to be in good hydrologic in accordance with NRCS standards, regardless of conditions existing at the time of computation. Predevelopment runoff calculations utilizing other hydrologic conditions may be utilized where stream channel erosion or localized flooding at the site does not exist provided that it is demonstrated to and approved by the local program authority that actual site conditions warrant such considerations.

F. Flooding and channel erosion impacts to stormwater conveyance systems shall be calculated for each point of stormwater discharge from the development and such calculations shall include estimates of runoff from the entire upstream watershed which

[1] Definition in ESC Law
[2] Need policy guidance for maximum increases in flow, or allowable slopes, and other measurable criteria.
[3] Need policy language for minimum criteria in order to support and encourage local initiative

also contributes to that point of stormwater discharge. Good engineering practices and calculations in accordance with DCR guidance shall be used to evaluate post development runoff characteristics and site hydrology, and flooding and channel erosion impacts.

4VAC50-60-73. Design Storms

For the purposes of this chapter, unless otherwise specified, the specified design storms shall be defined as the 1, 1.5, 2, and 10-year 24-hour storms using the site-specific rainfall precipitation frequency data recommended by the U.S. National Oceanic and Atmospheric Administration (NOAA) Atlas 14 or the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). The local program may allow for the use of the Modified Rational (critical storm duration) Method.